Rochester Electronics

Datasheet

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

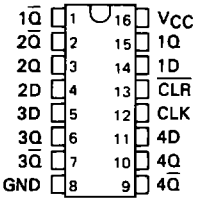
Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

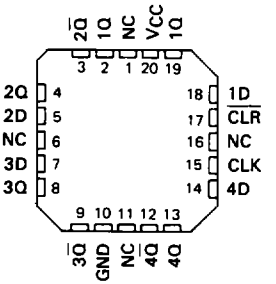
DECEMBER 1983 – REVISED MARCH 1988

- **Contains Four Flip-Flops with Double Rail Outputs**
- **Buffered Clock and Clear Inputs**
- **Individual Data Inputs to Each Flip-Flop**

SN54LS171 . . . J OR W PACKAGE
SN74LS171 . . . D OR N PACKAGE
(TOP VIEW)



SN54LS171 . . . FK PACKAGE
(TOP VIEW)



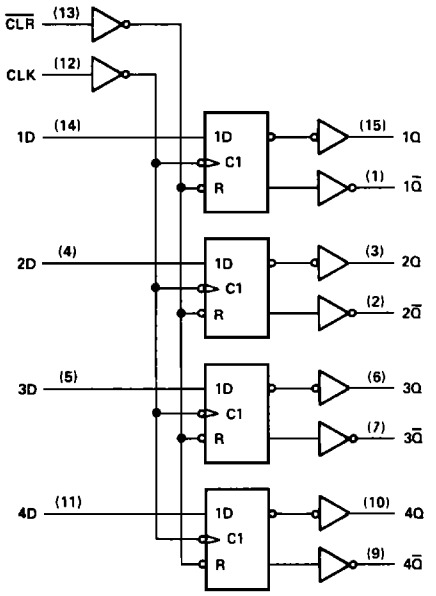
NC-No internal connection

description

These monolithic, positive-edge triggered flip-flops utilize the latest low-power Schottky circuitry to implement D-type flip-flop logic. They have a direct clear input and complementary outputs from each flip-flop.

Information at the D inputs meeting the setup time requirements is transferred to the Q outputs on the positive-going edge of the clock pulse. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive going pulse. When the clock input is at either the high or low level, the D input signal has no effect at the output.

logic diagram (positive logic)

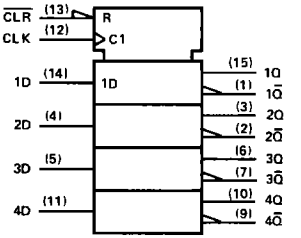


Pin numbers shown are for D, J, N, and W packages.

FUNCTION TABLE
(EACH FLIP-FLOP)

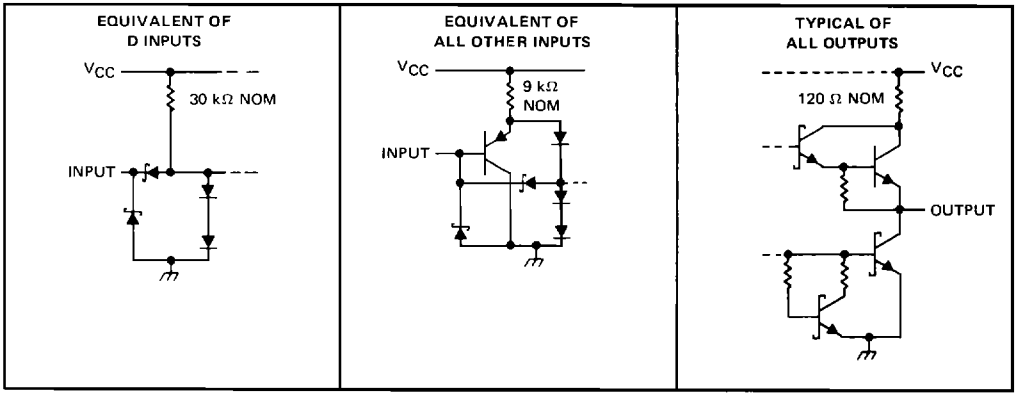
INPUTS			OUTPUTS	
CLR	CLK	D	Q	Q̄
L	X	X	L	H
H	↑	H	H	L
H	↑	L	L	H
H	L	X	Q_0	$\bar{Q}_0$

logic symbol†



†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

schematics of inputs and outputs



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (See Note 1) . . . . . 7 V
Input voltage . . . . . 7 V
Operating free-air temperature range: SN54LS171 Circuits . . . . . −55°C to 125°C
SN74LS171 Circuits . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

			SN54LS171			SN74LS171			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage		4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High-level input voltage		2			2			V
V_{IL}	Low-level input voltage				0.7			0.8	V
I_{OH}	High-level output current				−0.4			−0.4	mA
I_{OL}	Low-level output current				4			8	mA
f_{clock}	Clock frequency		0		20	0		20	MHz
t_w	Width of clock or clear pulse		20			20			ns
t_{su}	Setup time	Data input	20			20			ns
		Clear inactive-state	25			25			
t_h	Data hold time		5			5			ns
T_A	Operating free-air temperature		−55		125	0		70	°C

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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER			TEST CONDITIONS†			SN54LS171			SN74LS171			UNIT
						MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}	Input clamp voltage		V_{CC} = MIN, I_I = −18 mA					−1.5			−1.5	V
V_{OH}	High-level output voltage		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = MAX		I_{OH} = −1 mA	2.5	3.4		2.7	3.4		V
V_{OL}	Low-level output voltage		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = MAX		I_{OL} = 4 mA		0.25	0.4		0.25	0.4	V
					I_{OL} = 8 mA					0.35	0.5	V
I_I	Input current at maximum input voltage		V_{CC} = MAX, V_I = 7 V					0.1			0.1	mA
I_{IH}	High-level input current		V_{CC} = MAX, V_I = 2.7 V					20			20	μA
I_{IL}	Low-level input current	D inputs	V_{CC} = MAX, V_I = 0.4 V					−0.4			−0.4	mA
		All others						−0.2			−0.2	mA
I_{OS}§	Short-circuit output current		V_{CC} = MAX, V_O = 0 V			−20		−100	−20		−100	mA
I_{CC}	Supply current		V_{CC} = MAX, See Note 1				14	25		14	25	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.
§ Not more than one output should be shorted at a time and the duration of the short-circuit should not exceed one second.
NOTE 1. I_{CC} is measured with all inputs grounded and all outputs open.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'LS171			UNIT
				MIN	TYP	MAX	
f_{max}			R_L = 2 kΩ, C_L = 15 pF	20	30		MHz
t_{PLH}	CLK	Q, $\overline{Q}$			15	25	ns
t_{PHL}					18	30	ns
t_{PLH}	$\overline{CLR}$	Q			18	30	ns
t_{PHL}					24	40	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1